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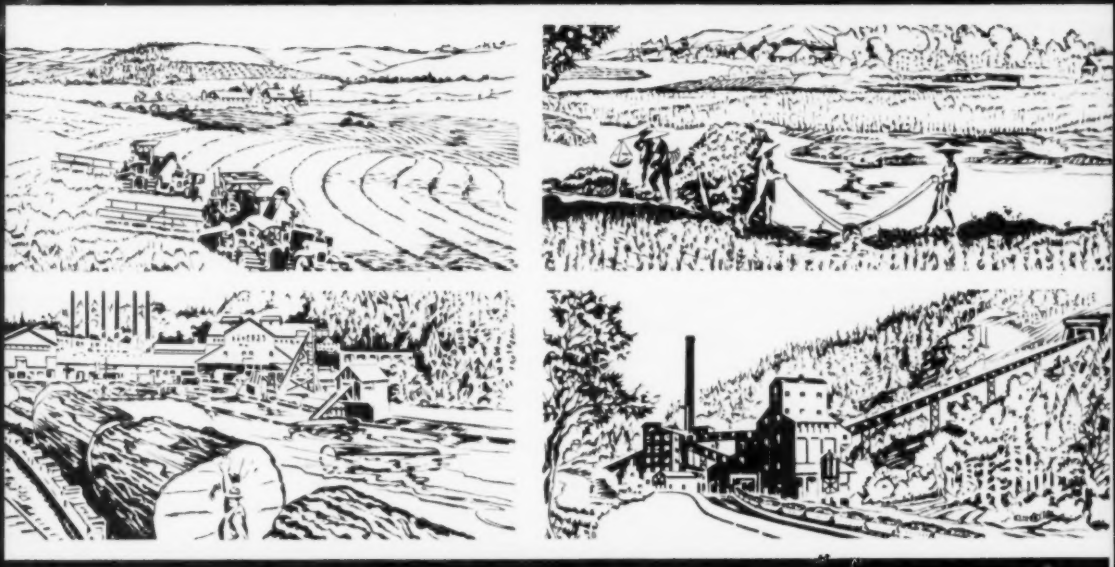

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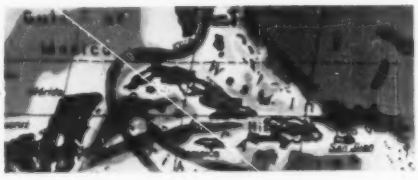

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VOLUME LVIII DECEMBER, 1959 NUMBER 9

IRRIGATION IN OKLAHOMA

JOHN W. MORRIS AND ARTHUR H. DOERR
University of Oklahoma

Irrigation has been expanding apace in regions with a chronic deficit of moisture. In addition, increasing attention is being directed toward irrigation in areas normally humid. Oklahoma is characterized by a variety of moisture situations ranging from the semiarid region in the western part of the Panhandle to humid conditions in "Little Dixie" in the southeast. This great range of precipitation, from less than 15 inches in the northwest to more than 55 inches in the southeast, affords a broad sampling base for examining irrigation under a variety of climatic conditions. Similarly variations in growing season, terrain, and soil from place to place are sufficiently great to provide a heterogeneity of irrigation circumstances. What then is the character of irrigation in Oklahoma?

The driest areas, in general, have developed irrigation to the greatest extent. The southwestern part of the state and the Panhandle are the most important irrigated regions. The west central part of the state follows and, curiously, the wet southeast is the next most important irrigated region (Fig. 1).

Sources of water, irrigation techniques, and crops produced vary considerably from place to place, but several generalizations about Oklahoma irrigation as a whole are valid. The principal source of water is ground water; capital investments in wells, ditches, and pipe are quickly amortized; new irrigation facilities expand rapidly during a dry period and lag during humid times. Other salient aspects of irrigation agriculture in Oklahoma are less subject to generalization, but these differences may be ascertained from a descriptive analysis of the irrigated areas.

PRIMARY IRRIGATION AREAS

Eight of Oklahoma's 77 counties have more than 40,000 irri-

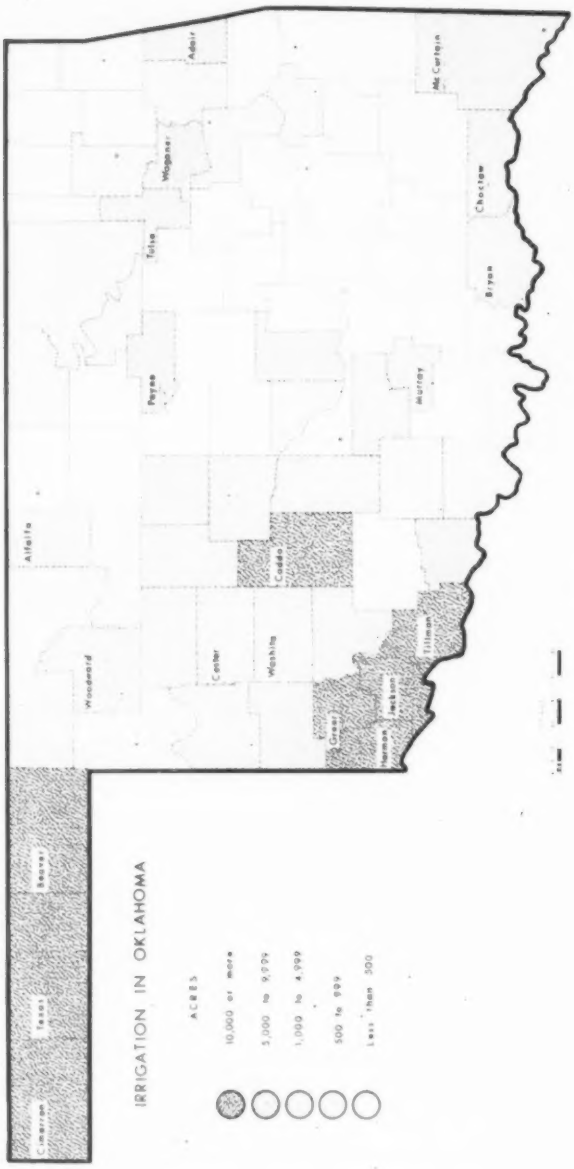
IRRIGATION IN OKLAHOMA
ACRES
10,000 or more
5,000 to 9,999
1,000 to 4,999
500 to 999
Less than 500
Cimarron
Texas
Beaver
Harper
Woodward
Alfalfa
Grant
Kay
Noble
Major
Garfield
Pawnee
Payne
Logan
Oklahoma
Lincoln
Pottawatomie
Cleveland
Creek
Okfuskee
Seminole
Hughes
Coal
Pontotoc
Johnston
Atoka
Pittsburg
Latimer
Le Flore
Haskell
Muskogee
Sequoyah
Adair
Wagoner
Tulsa
Mayes
Rogers
Mc Curtain
Choctaw
Bryan
Murray
Carter
Washita
Caddo
Grady
Stephens
Jefferson
Tillman
Jackson

Fig. 1.

gated acres.[1] Of these eight counties all but one are in the dry southwestern or northwestern parts of the state and the remaining one is in the subhumid west-central section. In terms of acreage the southwestern corner of the state is the most significant irrigated region. Harmon, Greer, Jackson, and Tillman counties have a combined total area of 117,000 acres under irrigation. This southwestern region with its high summer temperatures borders on the semiarid in spite of the fact that mean annual precipitation approximates 25 inches. The precipitation varies tremendously from year to year, ranging from slightly over 13 inches to more than 45 inches. The four months of the growing season, June to September, in the period from 1949-1955, received approximately 9 inches annually. In this same period, however, precipitation during the growing season varied from about 5 inches to more than 20 inches per year. The growing season is approximately 225 days with the killing frosts of spring occurring until about March 10 and killing frosts of fall coming about October 10.[2]

The soils of the area are generally quite fertile, ranging from neutral to slightly basic in reaction. Most would be classified as chestnut and brown soils by geographers. Terrain varies from rough stony breaks associated with geologic and man-induced erosion to isolated hills associated with the Quartz Mountains (part of the Wichita system) to large areas of quite flat plains. Irrigation is practiced on only the flat land.

Water sources vary considerably from county to county within the four county regions. Greer County reports 6,800 acres irrigated from ground water sources and 3,200 acres from surface sources (primarily from Lake Altus). In Harmon County essentially all water used is from ground sources. On the other hand, Jackson County reports 46,000 acres irrigated with surface water, primarily from Lake Altus, and only 5,000 acres irrigated from wells (Fig. 2). Tillman County irrigates 22,000 acres from wells and 2,000 acres from surface sources, principally the Red River. Gravity irrigation is most commonly practiced within the region, but sprinkler irri-

[1] Data obtained from Robert B. Duffin, *Distribution of Irrigated Acres in Oklahoma, 1957*, mimeographed report, Oklahoma State University, n.d., pp. 3 and 7.

[2] K. C. Davis and John F. Meek, *Economics of Ground Water Development on Farms in Southwest Oklahoma*, Bulletin No. B-499, Oklahoma State University, November, 1957, p. 4.

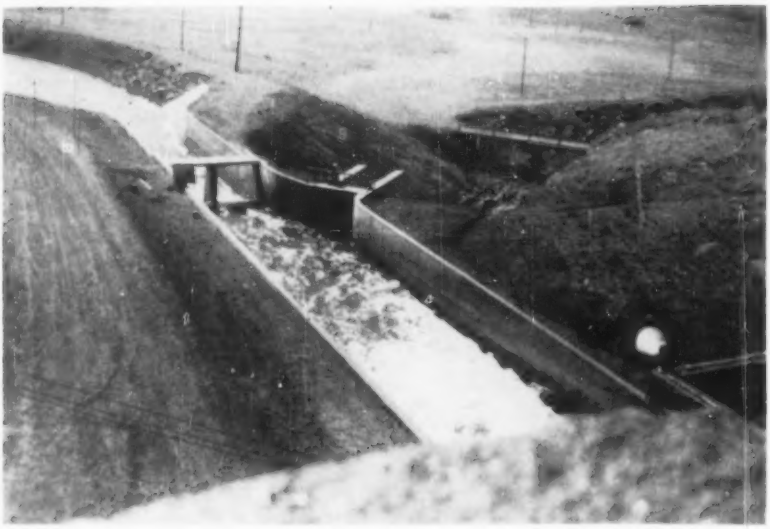

FIG. 2. Much of the water used for irrigation in Jackson County comes from Lake Altus which is located in the northeastern part of that county. The main ditch coming from the lake is cement lined. Gauges are located at the start of each diversion ditch.

gation is assuming increasing importance for certain kinds of irrigated crops, particularly fruits and vegetables[3] (Fig. 3).

Cotton is the most significant irrigated crop within the southwestern corner of Oklahoma, but grain and forage sorghums, alfalfa, and wheat loom large in the irrigation picture as well. Minor crops include vegetables, small grains other than wheat, and fruits (especially melons). Yields increase dramatically in response to irrigation. Results of some sample farm tests in Harmon County in 1954 and 1955 are shown in Table 1.[4]

The tremendous increase in yields is self-evident. Such increases are, in themselves, meaningless to the individual farm operator, however, unless he shows a profit. Irrigation is an expensive business. Leveling land, digging ditches, drilling wells, purchasing pipe, buying fuel to run pumps, and a host of other activities are costly. Irrigation does pay, however, and pays well

[3] Data obtained from Duffin, *op. cit.*, pp. 3 and 7, and Mr. LeRoy Howell, County Agent of Harmon County, personal communication, June 23, 1958.

[4] Davis and Meek, *op. cit.*, p. 13.

FIG. 3. The most common method of irrigation is by spraying. Water is carried to the area to be sprayed in aluminum pipes that can easily be moved from one place to another. This field of irrigated cotton is located near Fort Cobb in southern Caddo County.

in southwestern Oklahoma. Davis and Meek report increased yields on irrigated lands account for an increase in net income per acre of from $11.00 to almost $50.00 depending upon the crop and the year.[5]

In southwestern Oklahoma as in other parts of the state, expansion of irrigation facilities usually occurs during dry periods and a tendency toward complacency is apparent in wet years. The net effects of long time pumping of wells and the drilling of new wells

TABLE 1

PER ACRE YIELDS

Crop	1954		1955	
	Non-irrigated	Irrigated	Non-irrigated	Irrigated
Cotton lint	147 lbs.	731 lbs.	216 lbs.	603 lbs.
Wheat	11 bu.	38 bu.	6 bu.	38 bu.
Grain Sorghum	608 lbs.	2,293 lbs.	1,251 lbs.	2,427 lbs.
Alfalfa Hay	1 ton	3.7 tons	0 tons	1 ton
Alfalfa Seed	159 lbs.	368 lbs.	0 lbs.	262 lbs.[6]

on ground water levels is at this moment unknown. That expansion can not continue indefinitely is a certainty. Certain operators at present have the habit of over-irrigating and of applying water in a very haphazard fashion.[6] Water economies could be invoked which

[5] Davis and Meek, *ibid.*, pp. 18 and 23-25.

[6] Observations in the field and discussions with farmers indicate that they frequently over-irrigate if one is to believe the study by James E. Farton and Wayne D. Criddle, *Estimates of Consumptive-Use and Irrigation Water Requirements of Crops in Oklahoma*, Oklahoma Experiment Station, Technical Bulletin No. T-57.

would allow a substantial increase in irrigated acreage. Whether additional large scale surface reservoir projects within the region, like Lake Altus, should be attempted is problematical. The answer is probably in the negative since rivers flowing into the western part of the state have their sources in areas of lower annual rainfall than the area being irrigated.

The other large block of irrigated land from the standpoint of acres under irrigation is to be found in the Oklahoma Panhandle. The three Panhandle counties of Cimarron, Texas, and Beaver have almost 77,000 acres under irrigation in several widely scattered patches.[7] Irrigation got its start more than two decades ago, but received its greatest impetus after 1950. During 1952 and 1953 there was considerable expansion because of dry conditions prevailing in the region at that time.[8]

Chestnut brown soils, brown steppe soils, small patches of chernozems, and alluvium are high in fertility and yield very well under irrigation. According to the county agents of each of the Panhandle counties potash is available in abundance, phosphorous is generally good except on certain sandy soils, and nitrogen is often moderately weak. Minimal quantities of fertilizer and appropriate applications of water provide an excellent crop base.

Almost all of the water for irrigation in the Panhandle is obtained from underground sources, and, except in certain sections of Beaver County, flood irrigation is the dominant choice. In some sections, however, sprinkler irrigation techniques are used.

Grain and forage sorghums are by far the most significant irrigated crops; wheat is quite significant, and corn, alfalfa, pasture, and small grains are of lesser significance. No very careful or definitive studies of increases in crop yields have been done, but county agents report that in "average" years yields of most crops approximately double, and in dry years irrigation is the difference between a yield and a total crop failure.

The average cost of drilling a well, leveling land, installing pumps, and preparing ditches per establishment is $9,000 to $16,000. It is assumed that under normal conditions this cost will be amortized in about 10 years.[9] The advantages which accrue both to

[7] Duffin, *op. cit.*, pp. 2 and 7.

[8] Information obtained from Mr. Delbert Schwab, County Irrigation Specialist for the Panhandle during a personal interview, April, 1958.

[9] Delbert Schwab, personal interview, April, 1958.

land values and crop yield stability are evident in the average annual expansion of irrigated acreage over the last five years of about 8 per cent per year.

Irrigation is a boon to the dry northwestern part of Oklahoma and should be expanded to the limit of sustained ground water production to support it. Few further opportunities for surface irrigation are envisioned, altho completion of the proposed Optima Dam on the North Canadian might provide small quantities of water for this purpose.

Caddo County, the remaining county in the state with more than 10,000 acres under irrigation, has between 22,000 and 24,000 acres being irrigated.[10] Almost all irrigation here is of the sprinkler type, and ground water sources supply most of the water used, altho the Washita River supplies water enough to irrigate more than 1,000 acres. Most of the irrigation is centered in the northwestern portion of the county on sandy soils.

Peanuts are by far the most significant irrigated crop, with cotton and alfalfa next in relative importance. Truck crops, particularly watermelons, cantaloupes, and sweet potatoes, are assuming increasing importance as their quality becomes better known. Large increases in yields on sandy soils have been so encouraging that irrigation can logically be expected to expand to the limit of available water and suitable irrigable land.

Secondary Irrigation Areas

The second rank counties in terms of irrigated acreage (those with between 5,000 and 10,000 irrigated acres) are Custer, Washita, and Woodward Counties in the west-central part of Oklahoma and, like the counties with the largest irrigated acreages, are situated in the drier portion of the state. In Custer and Washita Counties cotton is the principal irrigated crop, with alfalfa, sorghums, wheat, and peanuts important secondary crops. Sprinkler irrigation is somewhat more important in these two counties, but flood irrigation is widely employed as well. In Washita County ground water and surface water from the Washita River are about equal in significance, but in Custer County ground water is four times as important as water taken from the Washita. In Woodward

[10] Duffin, *op. cit.*, page 2, suggests 22,400 acres, and Mr. Harry Liles, County Agent of Caddo County indicates that there are 24,000 irrigated acres, personal communication, June 9, 1958.

County the principal irrigated crops are sorghums with 3,000 acres, alfalfa with 2,500 acres, and small grains with 1,850 acres.[11] All of the water supply for irrigation in this county is subsurface.

The counties that have between 1,000 and 5,000 irrigated acreages are widely scattered thruout the state. Those in the western part of the state have crop dominances, water sources, and irrigation techniques compatible with their near neighbors that have more land under irrigation.

In the central part of the state, in a band extending from Alfalfa County in the north to Murray County in the south, the counties in the 1,000-5,000 irrigated acreage bracket present a contrasting irrigation picture. However, some generalizations are valid. Ground water is the principal source, but surface water may be locally important. Sprinkler irrigation is dominant, and crop specialties are numerous. Alfalfa is the one crop most typical of this belt, altho locally cotton, small grains, and vegetables assume considerable significance.

In a band from Payne County in the north-central part of Oklahoma to Adair County in the east-central part of the state is an area which certainly merits being called humid land irrigation. Payne County and Adair County irrigate primarily from surface sources, but Tulsa County and Wagoner County utilize underground sources. Alfalfa is the most widespread crop produced within these four counties, altho locally, particularly in Adair County, small fruits and vegetables are raised for freezing and canning.

Of the significant irrigation counties, Bryan, Choctaw, and McCurtain counties in the humid southeast are in many ways the most interesting. The use of irrigation in these counties illustrates that normally humid environments, because of the vagaries of climate, can benefit from irrigation.

Practically all the irrigation water for this southeastern area is obtained from the Red River or oxbow lakes along that river. Sprinkler irrigation is dominant. Cotton and sorghums are the principal irrigated crops, but several other crops assume local significance. For example, in McCurtain County corn, truck crops, especially tomatoes, and rice assume considerable importance.

[11] Personal communication from Mr. Bill Taggart, County Agent of Woodward County, June 9, 1958.

Yields of rice are normally high with a per acre yield of 97 bushels reported in 1956. This rice acreage could be expanded to more than 1,500 acres.[12]

CONCLUSION

Some of the figures on Oklahoma irrigation are impressive until they are analyzed with a bit more care. More than 4,100 farms in the state are irrigating from 2,895 irrigation wells plus countless surface sources. Principal crops irrigated in order of rank are sorghums, cotton, wheat, alfalfa, peanuts, pasture, vegetables, and corn.

Although 2,895 sprinkler systems are in operation, gravity irrigation continues to be more important, particularly in the west. The completion of dams now being constructed in western Oklahoma will add materially to the amount of surface water available for irrigation. Proposed and approved Federal lake projects in both the eastern and western parts of the state will also aid the cause of irrigation farming. Irrigation is expanding in all sections of Oklahoma that have a suitable water source, and this increase in irrigated acres promises to bring a measure of agricultural stability heretofore unknown. It should be borne in mind, however, that only .7 per cent of the area of Oklahoma is presently under irrigation. If one considers only land in farms then the figure rises to 2.1 per cent. In short, irrigation is presently important in Oklahoma agriculture, but it promises to be increasingly more important.

[12] Information about McCurtain County obtained from personal communication from John D. Netherton, County Agent, August 25, 1958.

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(Mountain climate [isolated])

VIII. Factors of Political Geography
A. Factors of space
(Location, size, and shape)
B. Population
1. Population problems and distribution of population
2. Ethnic factors
3. Population movements
4. Population trends
5. The human element changes balance of power
C. Resources, industry, transportation, and trade
1. Mineral resources
2. Land resources
3. Industry and its relation to power
4. Transportation and trade
5. Trade as a weapon
6. Transportation and communications potentials
D. The state
1. Structure of the state
2. The nuclear area, ecumene, and capital of a state
3. Units that make a state
4. Problem areas in the world today
5. Mandates, colonies, and other dependents
6. Political maturity and immaturity
7. Foreign policy of the state
E. Boundaries
(Natural, cultural, mathematical, complex, and inter-realm)
F. Power blocs
1. Western, Communist, neutral
2. What is a great power?

IX. World Regional Survey
A. Russia
B. China
C. Central Europe
D. Japan
E. Germany
F. France
G. Arab League
H. Great Britain

I. Italy
J. South America
K. The United States

We may depart from this outline whenever a world situation calls for a study of a particular area.

We could not find a text (at senior high level) that would cover the course just outlined. Instead, we use a reference library that has been set up in the classroom. Whenever possible, we invite resource people in to speak to the class, and in some cases, to teach areas about which they have special knowledge.

The fact that we do not use a basic text makes it *imperative* that each student keeps a notebook. These notebooks are checked periodically. They are the students' only source from which to study for a two-hour final examination.

TEACHING TECHNIQUES

Some of the techniques used in teaching this course are new to our school. They have worked to the satisfaction of the instructor and the administration. Some of these techniques are as follows:

1. Use of resource people to lecture or teach.
2. Dividing the class into groups and assigning them one of the topics listed under topic nine of the outline. A group may, for example, be assigned Germany. They will make a complete study of Germany, and when they have completed their work, enough booklets of their findings will be mimeographed to furnish each student in the class a copy. This group then holds a seminar with their classmates. Their final task is to prepare and administer a test on Germany. The instructor checks each step before it is carried to completion, especially the test that is to be given to the class.
3. Students are also paired off to make special investigations.
4. Oral reports are given whenever a special investigation topic is completed.
5. Each student is required to prepare a term paper, following the rules set down by universities in our area for advanced degree people.
6. All maps used are of notebook size and are blank. We take time to enter any data that are applicable on the blank maps.
7. Classroom discussions are promoted, whenever possible.
8. Audio-visual aids are used, whenever they can be used effectively.

RESULTS

This is the second year for this course.[1] The first year it was put in on a temporary basis and met with such success that now it is a permanent course in our curriculum. It is the eventual aim that every student graduating from our school will take this course.

The instructor was given the freedom to set this course up as

[1] This article was submitted for publication in the spring of 1959.

he desired. He made some minor revisions after the first year, and in all probability, there may be some made at the end of this year. This is to be expected when setting up a course that is relatively new at this grade level.

At present the instructor is keeping a file of the special investigations and regional surveys made by the students. His plans are to have next year's class, or the following year's class, compile their own textbook. This book will be one entirely written by students. This project will call for the cooperation of several departments.

It is our hope that this course, or a modification, may be introduced in other secondary schools. Our world has reached a point where no country may stand off as an observer. We must know more about the land and peoples of this world if we are to live in harmony with them.

Recently a report was made to the country, stating that we Americans do a poor job of creating good international relations. It was advocated that colleges put more time and effort into training our future diplomats. If the colleges are to meet this challenge, they must have students entering their institutions with a better knowledge of geography than they now have. The need for better understanding among the peoples of the world is at present a must if we are to survive. Our course should help to give students a more sympathetic understanding of other peoples and their needs.

GEOGRAPHY AS A FOUNDATION FOR CITY PLANNING

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Urban America has been growing at a phenomenal rate since the turn of the century, and future predictions indicate a continuous increase in urban population. This growth and the resultant problems of housing, transportation, education, crime, health, and taxation have stimulated an appreciation for the necessity of intelligent city planning. It has created a tremendous demand for pro-

fessionally trained planners who are capable of performing socio-economic analyses, of preparing proposals for physical development, and of formulating programs for action. Demand has far exceeded the supply, and consequently, people from many different educational backgrounds have been drawn into the field of city planning. Geography has been recognized as one of the adequate backgrounds for planning work, and many professional planners have been trained as geographers. From the occupational charts of the Association of American Geographers it is estimated that city planning is the occupation of approximately 150 present-day geographers. Two notable examples are Harold V. Miller, Executive Director of the Tennessee State Planning Commission, and Aelred J. Gray, Chief Community Planner with the Tennessee Valley Authority. Job bulletins published by the American Society of Planning Officials indicate a strong interest in people who are educated in the field of geography. Positions are available at the city, regional, state, and Federal level and with private planning consultants.

CITY PLANNING

The planning of cities is not new; however, only within recent years has it emerged as a definite part of government. City or urban planning may be defined as an intelligent means for examining the physical and cultural environment of an area, for analyzing the collected data, and for the application of such data to a comprehensive plan of community development using orderly methods, creative skills, and rational thinking.

The primary function of the planner is to initiate and maintain a comprehensive or master plan which outlines long-term community growth and development. Such a plan will involve land use planning, a program of community services, and a coordination of the two. To accomplish these functions, basic studies are necessary to determine the community land use pattern, economic base, population characteristics, and to prepare base maps. Special studies of particular features of the plan are then conducted of the area's street system, utilities systems, transportation systems, recreation facilities, public and semi-public facilities, and residential, business, and industrial districts. The major tools for implementing the plan are the zoning ordinance, thru which development is guided and the use of land is regulated; the official map, which gives legal

status to officially adopted parts of the comprehensive plan; subdivision regulations, which guide land development thru design and service standards; urban renewal programs, thru which local areas of blight and slum dwellings are eliminated and redeveloped; and the long-range financial plan, which presents the priority and type of capital improvements, revenues, and expenditures. The objective is to secure, thru a balanced and integrated program of community development, an orderly environment which insures everyone the best possible living and working conditions.

The subject matter of planning is as diverse as the physical and social elements of the city. It consists of people, land uses, government, economics, transportation, communication, aesthetics, utilities, public health and welfare, education, recreation, housing, business, and others. The planner determines which problems need attention and analyzes and measures factors related to them. He may find it necessary to make specialized studies of many problems such as housing needs and conditions, conservation or rehabilitation areas, annexation, library services, shopping center design, and transit operations. Whatever the planning program is, it should be continuously maintained and advisory in nature. Ideally it should be an integrated function of the governmental unit it serves.

Planning and Geography

Geography is a broad and inclusive subject. Among other things, it involves man's adjustment to the physical, biological, and social environment in which he lives. It explains why man does what he does, where he does it. Geographic relationships between human activities and environmental factors aid in explaining the landscape, in providing insights into domestic and foreign problems, and in making current events more interesting and intelligible. If a student plans to become a specialist in city planning he should take a general education course prior to specializing at the graduate level. Modern cultural geography appears to be one answer; it is a diverse type of science which is applicable to many fields such as economic, recreation, political, agricultural, transportation, urban, population, resource, and industrial geography.

Both the geography and the planning fields deal with design of structures, the arrangement of transportation and communication patterns, and the relations between human constructions and their intended functions. The geographer and planner may study cities

for the purpose of formulating basic concepts of growth, location, character, and resource potentials. They may analyze the city economically and provide information which is valuable for attracting industry and defining or expanding trade and service areas. Both are interested in the desirability of positive and comprehensive planning thru which the best possible urban environment may be obtained.

Geographic research also involves the analysis of areas, the identification of regions, the use of the map as a statistical and analytical device, and a heavy reliance upon field work. Using such methods geography has been able to contribute to planning thru the delimitation of geographic areas (such as enumeration districts), land use mapping and classification, predictions of future land requirements, aerial photography and photo interpretation techniques, and the concept of basic employment. Such methods and studies are intimately related to the planning process. The map is used by both as a basic tool for interpretation and presentation of data. Like the planner, the geographer analyzes the setting, describes the existing condition, tells why it exists and shows how it is related to its various components. But, unlike the planner, he does not go beyond the present scene. For example, the geographer may study a neighborhood area and make his presentation of it, but he seldom proposes regulatory or positive procedures for improving the area. However, the trained planner who has a geographic background should be qualified to do both. In fact, planning could possibly be defined as applied geography.

CITY PLANNING EDUCATION

In 1948 there were only 13 planning schools in the United States, and only three had more than ten students. Today there are 25 institutions of higher education which offer degrees in city or regional planning. Most offer only a two year master of planning degree, but it is possible to obtain a bachelor's degree at five schools and a doctor's degree at four schools. In 1953 the Southern Regional Congress on City Planning, a delegation of people actively engaged in planning work in the South, met for the purpose of reaching agreement on the programs and activities needed in city planning instruction, research, and service. It concluded that planning requires a mature and comprehensive mind and should normally be conducted on the graduate level with people of varied

prior education and experience. Graduate departments of city planning usually accept students who meet the requirements of their schools and who have previous training in architecture, landscape architecture, civil engineering, political science, public administration, economics, sociology, geography, or the humanities.

Planning schools tend to orient the core of their curricula around either design or the social sciences with sociology and public administration dominating where the social sciences are stressed. Many people believe that the trend in planning education should be in the direction of public administration and the social sciences. At the present, however, most city planning departments, altho they may not be design oriented, are within a school of architecture or landscape architecture. The core of most planning curricula is the various problem courses which provide practical experience in solving planning problems which are encountered in the professional field. Usually the problems involve small communities within the immediate region of the school. A series of such studies may consist of a major thorofare plan, an annexation study, a market analysis, a neighborhood analysis, a school study, an urban renewal project, and a complete comprehensive plan. Other basic studies which are encountered in almost every graduate school are planning administration, planning design, planning legislation (zoning, subdivision regulations, enabling acts), housing and urban development, land use, municipal government, a thesis, and a three-month internship in an approved planning office. Several schools allow the student a considerable number of electives in sociology, economics, and political science, and at some schools practically the entire program revolves around courses selected from outside the planning department.

According to the American Society of Planning Officials the fundamental skills requisite for planning are:

1) Knowledge of design—in order to visualize, understand and be able to organize two- and three-dimensional space for physical planning.
2) Knowledge of government and of public administration—in order to facilitate the integration of planning with other functions of government.
3) Knowledge of the social sciences—in order to become familiar with the economic and social forces which shape the structure of a community and determine the habit patterns of its people.
4) Knowledge of legal authority—in order to carry out planning law or to recommend desirable changes in it.
5) Knowledge and skill in effective presentation of ideas in written, oral and graphic form—in order to facilitate the understanding and acceptance of plans by other public agencies and by the public.

6) Knowledge of statistics—in order to facilitate the understanding and presentation of facts and figures.
7) Knowledge of cartography—in order to facilitate the understanding and presentation of physical relationships on the land.

Obviously, many students enter graduate planning school without being exposed to all of the above skills. They are handicapped to a considerable degree, but most planning schools attempt to equip them with a knowledge of these skills. Careful selection of undergraduate courses and electives will enable the student of geography to begin his planning education with the desired requisites. He should, however, carefully select a graduate planning program which befits his broad preparation and offers him the possibility of acquiring a broader intelligence. Some very desirable graduate programs are at the University of California, the University of Chicago, Cornell University, the Georgia Institute of Technology, Harvard University, the Massachusetts Institute of Technology, the University of North Carolina, the University of Oklahoma, the University of Pennsylvania, or the University of Southern California.

Geographic Training and Planning

In each of the 257 American institutions of higher education that offer a major or minor in geography, the curriculum is oriented toward either physical, human, regional, or biological geography. For administrative purposes 60 per cent of these schools classify geography as a social science, 20 per cent as a physical science, and the remaining 20 per cent as both a physical and social science. The student of geography who is interested in planning should not take a physical or biological sequence of study. Planning is for people, and a detailed knowledge of geological formations or of vegetation patterns will not be very useful. Also, a curriculum which stresses regional courses will not be very valuable; however, regional courses on North America may be beneficial since the potential planner will probably operate in that area of the world. It would not be advisable to take courses on Africa, Europe, Central America, South America, Asia, or Oceania. Such courses provide an excellent education for advanced geographic training, but the person entering city planning needs a more diverse background. This leaves human or cultural geography as the best existing curriculum for securing an undergraduate foundation for planning.

The student of geography must very carefully select the institution which offers him the possibility of securing a proper geo-

graphic foundation for city planning, and he should plan to supplement his geographic training with graduate work in city planning. The two degrees combined will give him a background almost as diverse as the field of city planning itself. Elements of geography (a survey of the field) and economic geography are the most widely taught of college courses on the subject and are necessary for their value as a foundation for future studies. The future planner should also take substantial amounts of urban geography, cartography, field techniques, map and photo interpretation, political geography, land use, conservation and resources, and transportation. This is where the selection of an institution is very important. Of the 257 schools offering geography degrees, only 67 offer cartography; 69 offer field courses; 154 offer resources or conservation; 13 offer land use; 24 offer advanced economic or industrial geography; 55 offer map interpretation; 13 offer transportation; 30 offer urban geography; 124 offer political geography; and 142 offer regional geography of their home region.[1] Aerial photography or photogrammetry is offered by only a very few institutions.

The future planner's freedom to take electives and the courses which are available will be of utmost importance. He should not expect all of his planning assignments to be in the realm of geography. The ability to speak and write are very important because it is thru these mediums that the planner persuades the community to adopt his plans. Therefore, writing courses and at least one speech course are essential. Also critically needed are elementary design, general mathematics, elementary statistics, and the social sciences. Perhaps survey courses in political science, sociology, psychology, economics, and public administration would be better than extremely specialized courses which require an equal amount of time. Other desirable courses are real estate, history, surveying, office management, principles of transportation, public finance, planning courses (if they are offered), and recreation programs and facilities. Naturally not all of the above listed courses can be taken, nor is the list complete, but the student should carefully select his undergraduate electives.

It would be very beneficial to the student of geography who is interested in planning to follow a special curriculum sequence devised for such a purpose. If possible, it would be desirable that he not be required to minor in any particular subject and that he be

[1] Statistics were obtained from U.S. Office of Education surveys.

given considerable latitude for electives. Most geography departments have a relatively small number of students and such a sequence could possibly increase enrollment. Some universities already offer geography work which helps place graduates in certain positions such as government service and transportation. A valuable service would be rendered if a similar program could be created for city planning.

Conclusion

Geography is an excellent background for the person who desires a career in city planning. He should plan, however, to secure a master's degree in planning and should very carefully chart his course of undergraduate geographic study and electives. The outlook for a planning career is very bright and the geographer going into planning can look forward to challenging work, to the satisfaction of public service, to financial reward, and to professional security.

POLITICAL GEOGRAPHY AND GEOPOLITICS

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The terms political geography and geopolitics have often been gravely misused during recent years. It is this malpractice that has driven the author to pen this article making clear once again the distinction that exists between these two disciplines. This is not original thought, nor is it original elaboration, for the task of clarifying the characters of political geography and geopolitics has been excellently fulfilled many times previously.[1]

Political Geography

Political geography[2] concerns itself with the politically organized area. The discipline relates, describes, and analyzes political

[1] Isaiah Bowman. "Geography v. geopolitics," *Geographical Review*, Vol. 32 (1942) p. 646.

George Kish. "Political geography into geopolitics: recent trends in Germany," *Geographical Review*, Vol. 32 (1942) p. 632.

Richard Hartshorne. "Recent developments in political geography," (I and II) *American Political Science Review*, No. 546 (Oct. and Dec., 1935).

[2] Preston E. James and Clarence F. Jones. Section on "Political Geography" in *American geography: inventory and prospect*, 1954, pp. 167-226.

units and the interplay that takes place between these units. The subject matter of political geography forms the basis for political events and relations. A factual account of the world's political units, nation by nation, territory by territory, town by town, in short, political unit by political unit, furnishes the political geographer with traditional method. An understanding of the subject, political geography, may be derived from a second methodological approach to the discipline. Studies of the economic, physical, human, and cultural aspects and data of the globe enable the political geographer to piece together the geography of any localized political activity. Either of these methods leads one back to a common core of materials. Political geography would therefore seem to contain certain universal elements common to any study of the discipline, no matter how fundamental or advanced.

Any attempt to understand the *all* of political geography as suggested in the second of the above methodological approaches constitutes indeed a challenge to the human mind. We can never hope to view all the political units of the world simultaneously and yet maintain an unbiased space-location perspective. This is obvious for the world is a spheroid and we can never expect to see the far side of the globe whilst we view the near side. This observation is true of the world globe and of the artificial classroom globe. Flatten the world in atlas form and immediately the invaluable space-location perspective is lost.

How then are we to understand political geography? Stephen Jones has suggested a combinative approach as the most satisfactory method of overcoming these failings of the human mind.[1] Our inability to understand the whole of political geography has prompted Jones to remind us that no incongruity exists in combining a number of individual approaches, forming a composite view. The integration of diverse approaches (for example, approaches thru resources, climate, culture, or government) enables the political geographer to arrive at the composite view. We must understand that inquiries of a joint human and physical nature must be made if the individual is to comprehend the significance of geographic investigation. To isolate the human inquiry from the physical inquiry may well sever the relationship in the individual's mind between the physical and the human elements. A realistic understanding of political organization succeeds only in so

[1] Stephen B. Jones, "Views of the political world," *Geographical Review*, 1955, p. 309.

far as we succeed in blending the human and the physical approaches.

In our flight from this maze of complication we have sought a more fundamental method in the study of the political unit. Theoreticians, following this method, focus their attention upon the single political unit, disregarding the composite view. Comprehension of the world's political geography may be amply obtained from this study method; the political geographer must extend his single unit studies thruout the world, studies which in their totality will provide him with an understanding of world political organization.

The study helps us to understand human, social, and cultural activity in relation to the physical environment. Political geography affords each individual some degree of systematization in his view of a colossal and complex world. Indeed, it would not be vain to boast that understanding born of an awareness of comparative political units has in itself developed an area of thought essential for the active and participating citizen.

GEOPOLITICS

Geopolitics[4] has served to focus attention upon political geography, for it has absorbed the data and framework supplied by the inquiry of the political geographer. This body of planned and calculated thought, which uses the broader frame of reference and mass of data afforded by political geography, has presented itself at one time or another and with varying degrees of success to the governments of most countries of the world. Historically, geopolitics arose with the nation-state system and has ever since functioned as an instrument of government: the recent development of German *Geopolitik*[5] as the political conscience of the state has further insured geopolitics a position in contemporary state government.

Geopolitics is essentially a body of thought developed in a given territory which seeks the maximization of its own ends. The geopolitician sees all other groups thru the spectacles of national interest, often becoming selfish to the point of greed, lust, and violence. The core of this discipline is power; the quest for power provides the guide to method.

Geopolitics can never furnish the objective truth of political ge-

[4] Robert Strausz-Hupé, *Geopolitics: the struggle for space and power*, 1942.
[5] *Zeitschrift für Geopolitik*.

ography. Frequently the geopolitic of a state is postulated by one individual who theorizes and conceptualizes, using as a foundation his own view of world history. We might, then, expect to find geopolities riddled with inaccuracy, unscientific generalization, bias, individual obstinacy, human greed, and desire of power and national achievement. Geopolitics is therefore a pseudoscience much more completely contained within itself than is political geography. It may not be possible to view the whole of political geography at any one time; this does not apply to the geopolitic of any one state.

Geopolitics is characterized by a dynamic quality, a quality which enables a shifting and disconcerting lack of continuity to pervade the subject. A state's existing geopolitical outlook will be rendered obsolete with each marked technological advance in the development of armaments. Mahan postulated geopolitics in an era of naval supremacy; later, Mackinder's geopolitics displaced this system when land force and heartland were regarded as the vital and decisive military factors; Seversky developed geopolitics when it was apparent that air forces were becoming predominant in the power struggle.[6]

Geopolitics, in short, is the name given to the prevailing thoughts, theories, and doctrines of a group who scheme to enhance the political organization of their choice. Advance usually occurs under the guise of labels such as *Lebensraum*, fulfillment, and destiny. Initiative stems from the driving force, patriotism.

The terms political geography and geopolitics may hardly, therefore, be regarded as interchangeable. Geopolitics may be regarded as an inevitable development of political geography; it may be regarded as a branch of political science which borrows its materials and techniques from political geography; it may be regarded as the discipline which popularized and helped systematize political geography; it may be regarded as a political instrument of the state. The differing natures of political geography and geopolitics may be attributed to a difference in emphasis rather than a difference in kind—but geopolitics is not political geography; neither is political geography geopolitics.

[6] Stephen B. Jones, "Global strategic views," *Geographical Review*, Vol. 45 (1955) p. 492

MAPS AND MAPPING IN THE FIRST GRADE[1]

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Should first graders draw maps? To many people the idea that six-year-olds be asked to draw maps seems shocking. And shocking it is, if we conceive of map-making in terms of commercial maps drawn by expert cartographers; however, whenever relations in space are represented in a scale different from reality, it is mapping. When children build with blocks the layout of the classroom, of the school on the playground, of the arrangement of play equipment at a nearby park, this is a map. Children can reproduce in blocks, with paints or other media, things that they themselves have seen in their environment. The important consideration is that the map represent something they themselves have seen. Children's observations will be sharper and their mapping more accurate if they look at a given sector of their environment with the intent of reproducing what they have seen in some map form. In fact, one of the major purposes in having children make maps at age six is to instill in them as early as possible the habit of careful observation and an interest in the importance of location.

Children's earliest map experiences follow upon observation of the classroom itself and visits thru the school. Their maps are largely with blocks and dramatic play using three-dimensional objects: a chair becoming a mountain, two blocks supporting a board to make a bridge over a river. Children may also be given opportunities to make pictorial representations of functions they observe in the classroom, principal's office, library, music room, heating and maintenance area, cafeteria, etc. Involved always is some consideration of the importance of location. Why are the various rooms where they are? What is the path of water pipes, electric wires, heating ducts? Is there some reason for the present arrangement of furniture, supplies, and equipment in the room? Could the arrangement be improved? To think in terms of the importance of location, children must be made aware of location.

MAPPING THE SCHOOL

With a background of mapping in blocks and pictures the

[1] This article is the second of a series and is based on a doctoral dissertation entitled: *A Framework for Developing Map Skills in Primary Grade Social Studies*, Stanford University, 1957.

things they have seen, children are ready for more abstract diagramming. Start with the first floor of the school. Draw it in the sand of the playground with sticks. Discuss the correct number and proper location of doors and windows. Orient the school as it is in space. The children can then play out various functions on this floor plan. They can be teacher and pupils, guests visiting between rooms, etc. Using such an experience with children in the first grade, Chase found that no one violated the map. The children "opened" windows, knocked on "doors," and did not walk thru walls.[2]

In the classroom they can draw the same plan on the floor. They can work for more accuracy. They can decide what symbols to use to represent doors, windows, etc. The diagram should be properly oriented, relative to the room. The children can now be introduced to the use of the key or legend.

As the children become more able, they can reproduce the floor plans of the school on paper. From the outdoor representation in the sand, to the floor plan, to the plan on paper, the children are improving in accuracy and learning about scale. Even though they may not know the meaning of the terms *large scale* and *small scale*, or even *scale*, they are learning that this same school building can be represented in various sized diagrams. Gradually, more symbols can be added, chairs, table, etc. All should agree on the symbols together. They can get ideas from each other. The teacher should make sure the orientation of the map is always correct and show children how to communicate their symbols with a legend. It is important to place the legend properly from the start. Put it in the *lower left corner* and show symbols and color used. The name of the map and the "cartographers" can be placed in the lower right corner. Geographers agree that accepted practice should be used from the very start, thus avoiding learning that will later have to be corrected.

Mapping the Home

Having gone thru this sequence discussed earlier under the teacher's direct guidance, children can be encouraged to do the same at home. They can study the various rooms and their functions, analyze the relation of each room to the whole house, analyze the layout in any particular room. They can discuss their discov-

[2] Harriet Chase. "Map Skills in the First Grade," *Social Education*, 19 (December, 1955), 361-62

eries at school and compare differences in various homes. They may try to understand why certain things were located in certain ways and how function might be affected if they were located differently.

How the basic human activities are carried on in the home can be discussed as they relate to functions of rooms, room distribution, room layout, etc. Such discussions should not require long periods of sitting and talking. Much of it can be induced by the children's interest in these activities as it is reflected at "sharing time." Some of it will appear in their dramatic play and can be guided into more fruitful learning by a few guide questions from the teacher that are picked up by the children. Much of such thinking can be encouraged in block building or in more lasting three-dimensional representations. A floor plan of a house may be a very difficult undertaking for a child, but with blocks he can accomplish much of the same kind of learning in a media he can handle.

Other similar activities are possible in the classroom where the teacher is able to give guidance and aid when necessary. The children can bring a doll house to school and together draw its plan. The group might visit a house being built and discover the floor plan before the enclosing walls and partitions shut it away from view. The teacher might be able to get a blueprint of a building in progress and simplify it for the children to study as they watch the building going up. The teacher might bring such a simplified blueprint to class. Some of the children might enjoy copying it; others will enjoy the opportunity of looking at it and recognizing doors, windows, etc. The class may draw a plan for the home of "The Three Bears" with bedroom (3 beds), living room (3 chairs), kitchen (table, stools, 3 bowls). They might build a "set" from their plans and dramatize the story.

MAPPING THE SCHOOL BLOCK

A trip around the school block might be planned. The basic human activities may be used as a checklist. Watch for fire alarm boxes, fire hydrants, sewers, traffic lights or stop signs, white lines for crossing the street as examples of conserving and protecting. Watering systems and care of lawns and shrubs are conserving too. If bare earth on a slope is visible within the school block, a trip soon after a rain may reveal some understanding of erosion. Children might look for mail boxes, newspaper boxes, telephone poles

and wires (communication). They might be asked to watch especially for all the different kinds of transportation they see. On a warm sunny day in a residential neighborhood, they might come back with quite a list: scooters, wagons, roller skates, tricycles, bicycles, doll carriages, baby carriages, cars, buses, trucks, etc. If necessary, remind them that walking is also transportation and see if some concept of the great service of the wheel can be developed in the classroom discussion later. The benefits of power added to the wheel can also be developed. It might be especially worthwhile to plan some walks around the block when the postman or milkman are making their deliveries, when sidewalk repairs are being made, when some construction is taking place, when a water main is being laid or repaired, etc. Repeated trips can be planned—to watch for seasonal changes. Select a bush or tree and watch its variations at each season. Watch for flowers, birds, and other evidences of each season. Watch also for man-made changes that occur in a block during a school year.

When the class returns to the classroom, they should discuss and act out what they have seen. Children should be encouraged to develop images using all of their senses. Have them describe sounds, smells, etc. Have them pretend that they are the dog they saw or the little children at play with a wagon, etc. If something exciting in the world of adults occurred along the way, let them dramatize that also. The trip might have been planned for various reasons and the specific reason would influence the reorganization of that excursion in the classroom. At least one trip should be taken around the block for the purpose of checking the streets that bound the school block, and the children should observe carefully with this in mind. These streets should then be put on a map and the school set on the map in proper orientation. Thereafter, various other symbols may be added, for example, when a trip is made specifically to observe conserving and protecting functions in the block surrounding the school.

For children who live in a rural area, a walk along the roads bounding the school could be equally instructive. These children, too, could check for means of fire protection, observe carefully the physical features of the land and the use to which it is being put, look for signs of irrigation or lack of it, signs of erosion and protection from erosion, watch for all the means of transportation they encounter, notice telephone poles and wires, watch for mail and

newspaper boxes (perhaps see the mailman on his delivery route), notice the natural beauties and destruction of such beauty by encroachments of the city, etc. If by any chance a cultivated field or farm with dairy animals, chickens, etc., is within the area, a visit to analyze the layout may be possible. Visits to farms of several members of the class might also be possible. Likenesses and differences in land-use and layout of the grounds, relative location of house, barn, fields, animals, etc., could be compared.

STUDY OF CARDINAL DIRECTIONS

There is a difference of opinion as to whether children should be given cardinal directions for their maps at this age, Kohn, for example, says:

> Contrary to the belief of many, a sense of direction is not inborn but is learned. The process begins with helping children develop the ability to orient themselves . . . in relation to things in their environment. . . . The use of cardinal directions should be started as early as first grade.[3]

Directions in space can be taught and depend on outdoor experiences. Lord says:

> Those persons who have well-developed abilities with regard to orientation seem to have cardinal directions related to their bodily positions at any given time. . . . There is a real need for out-of-door exercises, observations, and drill with regard to directions. Children lack the foundational experience necessary to make directions in space meaningful.[4]

The question is how early does one start to teach children cardinal directions. Howe[5] experimented with a procedure of teaching cardinal directions by the sun with first, second, and third grade children. He was successful with 50 per cent of first graders, 75 per cent of second graders, and 88 per cent of third graders. He concludes that it is probably best to wait until third grade.

There are two possible aspects of readiness for cardinal directions that might be developed. Children could be taken out-of-doors, on the playground, to observe that the sun changes its position at different times of the day (morning, noon, late afternoon), but do not associate this with cardinal directions as yet. Secondly, when

[3] Clyde F. Kohn, "Interpreting Maps and Globes," *Skills in Social Studies, 24th Yearbook*, NCSS. National Council for the Social Studies, Washington, 1953, p. 147.

[4] Francis Everette Lord, "A Study of Spatial Orientation of Children," *Journal of Educational Research*, 34 (March, 1941), 501.

[5] George F. Howe, "Teaching of Directions in Space," *Journal of Geography*, 31 (May, 1932), 209.

children make maps showing the streets or roads bounding the school area, they may be given the terms *North*, *South*, *East*, and *West*, to put on their maps. These words may be used similar to the way we use page numbers with children long before they understand their full meaning. The purpose here would be merely to familiarize the children with the terms as such. Perhaps some of the children who were ready to understand the concept would ask further questions, and there would certainly be no objection to having children master such concepts if they are able. It might be worthwhile to discover if such a readiness program for cardinal directions in first grade would produce a group of second graders who would show a larger percentage of success than Howe's second grade group: or if such a readiness program were carried on in first and second grade, to see whether *more* than 88 per cent of third graders would then be successful with learning cardinal directions. It would also be interesting to discover if farm children learn cardinal directions more easily than city children, and if so, some of the possible reasons.

Mapping of Elevation

Another concept difficult to portray on a map is elevation. Mitchell says that vertical orientation is more difficult for children than horizontal. She suggests that before symbols of relief are presented, "try to get a dramatic, motor sense, of elevation."[6] In first grade it may be best to represent elevation largely in three-dimensional symbols. Children can put chairs in a row to represent a wall or partition, leaving openings for doors, a stick across for a window, etc. Thus, the third dimension is clearly an obstacle to movement. The children then play in this structure. When young children draw pictures, they use various means of showing three dimensions. They should not be pushed beyond these natural representations at this age. Two dimensional diagramming should represent only horizontal orientation.

What About the Globe?

A simple globe should be present in the room. Some people believe that the introductory globe should show only the major water bodies and land masses. The children should be encouraged to investigate it and their questions should be answered simply. They

[6] Lucy Sprague Mitchell. *Young Geographers*. John Day Co., New York. 1934, p. 50

should be told that the globe is a model of the earth. Show them where their home is on the globe. Modern geographers agree that a simple globe for informal use should be present in the first grade classroom. Barton made a study of the informal use of globes in primary grades. He found that children ask good questions and make discoveries. He concludes that teachers can ". . . help establish the understanding that they [globes] are representation of the earth. . . . When globes are made available, many children soon learn to name and identify continents and oceans."[7]

[7] Thomas F. Barton. "Geographic Instruction in the Primary Grades," *Geographic Approaches to Social Education, 19th Yearbook*, NCSS. National Council for the Social Studies, Washington, 1948. p. 215.

CAPTURING THE IMAGINATION AND CHANNELING THE ENERGIES OF YOUTH THRU A JUNIOR GEOGRAPHY CLUB

ROBERT N. THOMAS
Hampton Township Junior-Senior High School
Allison Park, Pa.

America is a society of organizations. We all realize the importance of most of these and give freely of our time to maintain them. Teenagers, too, are organization conscious. These high school people have a definite need as young adults to expend their physical and mental energies on well-organized, active, and constructive clubs. Why not channel this need and this desire to advance the field of geography? This can best be accomplished thru the initiation of geography clubs in our junior and senior high school activity programs. Consequently in the Hampton Township Junior-Senior High School of Allison Park, Pennsylvania, a geography club was formed.

MAINTAINING THE CLUB

Any club to be successful, maintain the interest of its members, and favorably impress the faculty and administration has to be a live, active, and growing organization. The club at Hampton is by no means perfect in every respect. If it were, it would present no challenge to its members or sponsor, and soon die of complacency. It has, tho, many characteristics which are necessary for a good club.

First of all, our organization has several "irons in the fire" at all times. Young people thrive on this aspect alone because they like to be kept busy and their minds need a variety of stimuli. The school schedule is so arranged that fifth period on Monday and Friday are activity periods. Presently, our group meets once each week on Friday. It is a combined junior-senior high club. Next year, due to increased interest and greater school enrollment, we plan to divide into a junior and senior high club. The two groups will organize separately, meet on different days, either Monday or Friday, but participate in most other activities as one body.

At our first meeting in the fall we organize, electing officers whose duties are the same as most clubs. During this initial meeting each member makes out a copy of his schedule to be kept on file by the sponsor in case the whereabouts of any member is ever needed. In the second meeting the various objectives of the club are discussed, partially pupil- and partially teacher-initiated, since high school pupils need and respect guidance. These objectives fall into one of two categories, either instructional or financial. Each member of the club is required to construct a geography project, the best of which are entered in the Western Pennsylvania Geography Show held each January at the Buhl Planetarium in Pittsburgh. Numerous club periods are used for research gathering for these projects. Simultaneously, while this research is taking place, the club holds a dance, sells fruit cakes, sponsors a faculty-junior varsity basketball game, and participates in a public relations project for the high school at a local shopping center. These activities keep us busy until Christmas vacation.

Geography Club Assembly

Immediately upon the return from the holidays, we begin planning for our Geography Club assembly. This program, presented the second Wednesday in March, takes the form of a geographical contest. Two pupils are chosen by competitive examination to represent each of the six grades from seven to twelve. The contestants are escorted on stage by one of the girls dressed in the native costume of a foreign country. Attached to the front of each table where the contestants are seated is a mural depicting the geography of the country represented by the escorting girl. All of these introductions are made to the theme music from the movie, "Around the World in Eighty Days." The same girl escort then takes her place

behind her contestants and acts as their scorekeeper. As soon as all introductions are made by the Mistress of Ceremonies, the Master of Ceremonies is introduced. His first duty is to explain the mechanics of the contest to the contestants and audience. While he is making his explanation, a large electronically controlled movie screen is lowered. First the lights go out, then the question, a multiple choice on a frosted 4" x $3\frac{1}{4}$" slide, is flashed on the screen. The contestants have 30 seconds to make their choice from three possible answers. Their choice is made known to the audience and scorekeepers when the contestants place a large 1, 2, or 3, into a slot in a block of wood on the front of their desk. During this time a recording of the "Syncopated Clock" is played with the seconds being counted off by striking a block of wood with a drum stick. A warning buzzer is sounded at 20 seconds, and a gong is struck at the end of 30 seconds. When the gong sounds, the lights come on and the MC repeats the question giving all three answers. As soon as he says, "The correct answer is—," the lights go out again and a pale blue light blinks on the table of each grade which has the correct answer. This light system was constructed by one of our electronically-minded boys, and is actually a rather simple device. Altho the blinking bulbs are superfluous, they add to the color of the show. In approximately ten seconds, the lights come on again and the girl scorekeepers standing behind the contestants with the correct answers, add one point to their score by placing the correct number of points into a block of wood held on a level music stand. There are 35 questions to the quiz which takes about one hour. The whole show is built on split-second timing; this helps to impress our audience. We award a gift certificate from a local book store to the two winning contestants. In case of a tie, we have a tie-breaking question in reserve.

GEOGRAPHICAL TOUR

As soon as we present our assembly, the group starts planning for our major project of the year, a five day, four night geographical tour. This takes place the week after school is dismissed. We stay overnight at American Youth Hostels (75¢ a night), plan and prepare our own meals, and make our own trip contacts. During the various tours, our boys and girls were uniformily dressed. They all wore either khaki trousers, or khaki skirt, open white shirt or white blouse, low cut shoes and white socks, and an inexpensive

(75¢) blue and white blazer which was made by their parents. With all 43 members so dressed, we made a very neat appearance wherever we met the public.

Our most recent tour left Hampton on Monday morning, June 8, 1959, and returned to the school Friday afternoon, June 12, 1959. Monday was used to drive to our "base of operations" at Bowmansville, near Reading, Pennsylvania. That evening the houseparents of the hostel showed colored slides and explained the customs of the Pennsylvania Dutch folk who inhabit the region.

Tuesday morning was spent touring the State Capitol at Harrisburg as the guest of Senator Robert Fleming, who presented our group to Governor David Lawrence and introduced our club in a very impressive fashion to the State Senate. That afternoon we visited the plant of the Hershey Chocolate Company and the community park at Hershey. That same evening the club members engaged in a lively softball game with the young folk of the Bowmansville Mennonite church. It proved an interesting social contact.

Wednesday morning the club was shown thru the Berkshire Knitting Mills at Reading, while the afternoon was spent in recreational pursuits at French Creek State Park. At five o'clock the same afternoon we were guests at the Mennonite farm of Bartram Leaman, RD #1, Denver, Pennsylvania. After all had devoured a traditional Pennsylvania Dutch dinner served family style, the remainder of the evening was spent riding horses, driving tractors, and any member who desired could try their skill at milking a cow.

A tour of the Giant-Portland Cement Company at Allentown was scheduled for Thursday morning. This was followed by an afternoon of swimming, boating, and fishing at Saylor's Lake in the Pocono Mountains.

Friday was used for the return trip to Hampton.

Duty rosters were prepared so all could share in the work responsibilities. Each parent was contacted three times during the week by means of a "round robin" telephone plan. Only one call was made back home telling of the days activities, each parent communicating the news to the next person on a pre-arranged list.

Most of the plans for the tour were made by the members during club period. With the aid of the cafeteria supervisor and school nurse the pupils drew up the menu. They also decided the route to be followed, made reports on the geographical regions they would see, drew maps of most of the areas they would visit, constructed a

brochure describing the entire trip, and carried on the majority of the correspondence. All of this assistance was a great help in constructing a set of well-laid plans before the group left Hampton.

Altho many days and nights went into the planning for the trip, the progressive administrators of our school headed by Cyril C. Sarver, Supervising Principal, believe this type of educational and social experience is well worth the effort, time, and money expended.

SUMMARY

This school year described was the second for our Geography Club as an organization at Hampton. The student interest is keen, sincere, and at times overwhelming, which helps make geography thru our senior high courses, junior high courses, and our geography club, an ever-expanding field bridging the gap between the natural and social sciences.

GEOGRAPHIC TWENTY QUESTIONS

JOHN W. PAWLING
Michigan State University
East Lansing, Michigan

The junior high school boy or girl is normally interested in playing games of any kind. The motivation of students in such play-activity, in combination with the teaching of subject-matter material, results in an excellent learning situation. The game "Geographic Twenty Questions" resolves subject-matter motivation in a classroom activity that makes for easy teaching.

The rules of the game are similar in many ways to the old parlor game of "Twenty Questions" as adapted for television. A student presents his mystery subject to the class after an opening clue is given as to the animal, vegetable, or mineral status of the subject. The class then functions as a group in submitting a maximum of 20 questions in an attempt to correctly identify the mystery subject. The student leads the question and answer period and keeps a tally of all questions answered. All questions must be so phrased as to receive a 'yes' or 'no' answer. The student correctly identifying the mystery subject is rewarded by leading the next round of twenty questions.

An important refinement may be engineered once the class understands the use of the animal, vegetable, mineral categories. At this point, compound clues may be introduced by combining the animal-vegetable-mineral category with a physical-cultural classification. Thus the Grand Canyon would fall in the "mineral-physical" category, while Mt. Rushmore is clearly within the "mineral-cultural" classification. The student should first inform the teacher of his mystery subject before the game commences. The teacher will then be in a position to render judgment in any borderline classification that might arise.

A basic concept in playing "Geographic Twenty Questions" is that the subject must be unique (i.e., the Liberty Bell) with a specific location (Philadelphia, Pa.). Obviously, a knowledge of geographic locations will serve as an important clue in identifying the mystery subject.

Before playing the game, however, it is important that the teacher first demonstrate the mechanics of the game. Rules and regulations should be clearly stated. In addition, the teacher should illustrate how maps may be used in pinning down specific locations and how the identity of the mystery subject becomes an easy matter once its location is known. Many locational techniques, i.e., hemispheres, continents, directions north or south of certain rivers, may be brought out. As the class progresses thru the year, other divisional material such as Prime Meridian, Equator, Mason-Dixon Line may be included.

Many refinements of the game remain within the ingenuity of the individual teacher. For example, a rating scale may be incorporated to gauge the overall "I.Q." of the entire class: mystery subjects correctly identified in less than 10 questions merit a "genius" rating for the class; between 10 and 15 questions deserve an "average" rating; 15 to 20 questions might call for a "very poor" rating; and the inability to arrive at an answer may justify a "beyond hope" rating as both descriptive and amusing. A class average may then be determined at the end of the hour and utilized as a criterion in future sessions.

RECIPE FOR A PAPIER-MÂCHÉ RELIEF MAP

The following recipe was provided by Mr. Maynard Hess, a senior at Trenton State College, who became acquainted with the project while practice teaching in River Street School, Red Bank, New Jersey.

Materials needed:

1. Old newspapers.
2. Wheat paste or flour.
3. Bucket or similar container.
4. Pan.
5. Map—if map is to be traced.
6. Backing—cardboard or plywood may be used for this purpose. The plywood is best for very large maps.
7. Paint (Showcard), crayon, colored ink, etc.
8. Glue and/or small nails.

Making the papier-mâché:

1. Tear newspaper into very small pieces. Three large sheets of newspaper will make approximately one cup of pulp. A large quantity of *pulp* may be made and stored.
2. Put to soak in bucket of water overnight.
3. Put the paper in a cloth and squeeze out the excess water.
4. Knead with hands until pulpy. Store in a covered container until needed.
5. Mix paste (or flour) and water in pan to a heavy creamy consistency.
6. Measure amount of paper pulp to be used, add paste until the *papier-mâché* has the firmness of clay; paste should not lie on surface. Approximately one part of paste or flour to two parts paper. Mix only enough for immediate use to prevent spoilage.

Constructing the map

1. Place outline of map on working surface. If working surface is porous, wax paper should be placed between it and the *papier-mâché* until the map is dry enough to be handled, then remove so that air may dry the map thoroly.
2. Fill in the outline with *papier-mâché*.
3. Build as high as desired, being careful to keep a good thickness all over.
4. Allow to dry thoroly. This may take from two to four days.
5. Paint the *papier-mâché* or color it in any desired fashion.
6. Fasten the map to the backing with glue. Light nails may be used if the backing is wood.
7. Clear shellac brushed over entire map will protect and preserve it.

CITATION

Distinguished Service Award to Katheryne Thomas Whittemore

Katheryne Thomas Whittemore, A.B., Vassar College, M.A. and Ph.D. Clark University, is the 1959 recipient of the Distinguished Service Award. This award, by declaration and tradition of the National Council for Geographic Education, is to be understood as carrying the highest honor that the Council can bestow. Keeping in mind the organization's basic criteria that the prestige and hence the distinguishing value of the Award depend very largely upon the care exercised by the committee on its bestowal, every effort has been made to poll the sentiments of all members of the committee in determining this year's awardee. Moreover, members of the committee were solicited for citation statements which in their judgment best serve as guideposts in measuring the distinguishing merits of the nominee. Thus the citation represents a composite committee appraisal of Dr. Whittemore's professional competence in her many-sided contributions to the discipline of geography. As the twenty-sixth award since the establishment of this recognition of honor in 1931, it constitutes the sixth citation for a woman geographer.

Varied as have been Dr. Whittemore's professional activities, her work has been primarily centered in the area of geographic education. Among the first of women geography teachers to travel around the world, she pioneered a career of teaching in Alaska, Japan, and the Philippines—at Fairbanks, Tokyo, and Manila, respectively—from 1921 to 1923. Upon her return to the states by way of the Middle East and Europe, she became attached to State University of New York College for Teachers in 1925, and there served successively as instructor, assistant professor, associate professor, and professor of geography. As chairman, as well as professor of the geography department, she influenced hundreds of students and promoted geography in education, both instructionally and administratively, over a wide area.

For many years she taught a geography class to elementary level students in addition to college teaching, thus giving her exceptional perspective and understanding in preparing teachers for more effective teaching of geography. Both students and colleagues shared the benefits of her resourcefulness in the organization of ideas, of methods of procedure, and the inspiration and confidence of her leadership.

But her personal and professional influence was not limited to the classroom. She has been consulted by the State Department of Education, directors of school systems, teacher and planning groups on curricular organization, on courses and on teaching techniques, and as a speaker she has been in great demand as consultant and panelist at numerous educational conferences. Appointment in 1957 to the directorship of the Division of Arts and Sciences of the State University of New York College for Teachers attests further to the high regard of the nominee's administrative competence. The division includes all the academic departments of the College which has a staff of over 80, including departmental chairmen. Representing one of the chief college administrative positions, this appointment carries with it responsibilities for coordinating the faculty recruitment program for this division and otherwise working with departmental chairmen as an advisory committee to develop courses and maintain quality of instruction.

Author of *Asia the Great Continent* and *United States and Canada*, Dr. Whittemore has also been active in the publication field, which includes numerous articles in both educational and regional geography. Contributions in the JOURNAL OF GEOGRAPHY feature book reviews and reports on presidential activities. Her textbooks, widely adopted in the public schools, have added to her national reputation as an educator. Diverse and distinguished also have been her societal affiliations and activities, including

membership in the Association of American Geographers, the American Geographical Society, the National Council for Geographic Education of which she was president in 1946, American Geographic Society of Woman Geographers, American Association of University Women, and American Association of University Professors. The eminence of her leadership is the basis for the inclusion of her name in the first edition of *Who's Who of American Women*.

In recognition, then, of the high esteem of the personal attributes and the professional achievements and affiliations of the nominee, we are pleased to honor Dr. Katheryne Thomas Whittemore with the Distinguished Service Award for 1959.

Distinguished Service Award Committee

Alfred H. Meyer, Chairman
M. Melvina Svec
Adelbert K. Botts, President, NCGE
Lorrin G. Kennamer, Jr., Secretary, NCGE
Otis W. Freeman
Norah E. Zinc
Ina C. Robertson

Detroit, November 27, 1959

THE NATIONAL COUNCIL AT WORK

One of the important functions of an organization such as the National Council for Geographic Education is to establish and maintain contacts with other groups for the purpose of promoting material growth and mutually increasing our effectiveness.

During the current year the Council has participated in several such contacts. From September 29 to October 2, 1959 our council was represented by Dr. John W. Morris, First Vice President and Dr. Tim K. Kelly, University of Colorado, at the meeting of the United States National Commission for UNESCO when it met in Denver, Colorado. Mrs. Erna G. Gilland, California, Pennsylvania, represented us at the Assembly of Delegates of the World Confederation of Organizations of the Teaching Profession when that organization met in Washington, D.C., July 26-August 12, 1959.

The Council on Cooperation In Teacher Education of the American Council on Education met in Washington, D.C. on October 22-24. Our Council was represented at those meetings by Dr. Kenneth Bertrand of the Catholic University of America, Washington, D.C.

During the same weekend several other members of NCGE participated in a program sponsored by the New York Metropolitan Division and the New York-Ontario Division of the Association of American Geographers. Meeting at Vassar College, Poughkeepsie, New York, Dr. Adelbert K. Botts, President of NCGE; Miss Dorothy Fraser, City College, New York City; Dr. Daniel Jacobson, Montclair State College; and Dr. Preston E. James, Syracuse University took part in a panel, "The Geographic Training Necessary For the Training of Social Studies Teachers" under the chairmanship of Dr. Laura M. Shufelt, State Department of Education, Albany.

Adelbert K. Botts, President

BOOK REVIEWS

Malcolm Davies. **Geographic Dictionary**. Baltimore Public Schools, Baltimore 18, Maryland, 1958. 128 pages with index, diagrams and definitions. $1.00.

One is likely to put down this attractive little book with a feeling of exasperation, for here is another good idea that falls short in actual accomplishment. The book consists of 343 so-called geographic terms arranged alphabetically, defined briefly, and illustrated by pleasant little sketches. That the author served with the United States Navy during World War II may explain the preponderance of physical and mathematical terms. Cultural and economic aspects of geography are represented by a mere handful of terms; political geography by one lone buffer state; and urban geography not at all.

Then, too, the author is wed to the idea that geography is the study of man's relation to the natural environment. Apparently, it is important to understand the physical background for man's activities, but not much about men's relations to one another. Isn't it high time to drop this myth which has persisted in the public schools long after it has been abandoned by college faculties?

Unfortunately, even the physical environment gets less than perfect treatment. Some of the physiographic terms are carelessly illustrated. For instance, the terms *fault* and *graben* are confused in the sketch, tho not in the definition. The diagram illustrating the *fall line* is quite misleading. And the diagram illustrating the tetrahedral theory seems to bear no relation to the definition.

The fundamental idea of the book is a good one. With more careful selection of terms, a broader interpretation of what geography covers, and a little better editing, such a book might be exceedingly useful.

Marion Fisher Murphy

Princeton, Massachusetts

Patricia Lauber. **Changing the Face of North America.** Coward-McCann, Inc., 210 Madison Avenue, New York, 1959. 96 pages with index. 49 photographs, 9 full-page maps, 1 full-plate diagram. $2.50.

Up-to-date factual materials on topics commonly included in the geography course of study are always welcomed by the classroom teacher. It is a pleasure, therefore, to recommend this interestingly written and authentic book on the St. Lawrence Seaway for supplementary reading. It can be used with more advanced students at the fifth grade level and for general reading assignments in the junior high school.

Changing the Face of North America is a timely presentation of the story of the seaway. Its opening chapter discusses the explorers and traders who, early in the seventeenth century, discovered and used the water route which led into the heart of the new continent. Chapter 2 is devoted to a description of the physical characteristics of the water route and of the early attempts to canalize the St. Lawrence and other difficult passages along the route. A cleverly-designed diagram showing the operations of a lock is included on page 25. Chapter 3 presents a discussion of the many resources of the Middle West which, because of their bulk and weight, require low cost transportation. Arguments for and against the building of the seaway are presented in Chapter 4 together with a discussion of events following World War II which finally led to its construction. The actual task of building the new water routes is described in Chapter 5, and the concluding chapter introduces the concept of America's "Fourth Seacoast," and discusses the new "seaports" which will undoubtedly be affected by ocean shipping as it develops on the Great Lakes. The photographs are excellent.

Clyde F. Kohn

State University of Iowa

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BOOK REVIEWS

David Lowenthal. **George Perkins Marsh: Versatile Vermonter.** Columbia University Press, 2960 Broadway, New York 27, New York, 1958. xii and 442 pages with illustrations, bibliography, index, and table of contents. $6.50.

Geographers, like scholars in many academic disciplines, are typically ill informed concerning the lives and works of their professional ancestors. Too few of us are as cognizant as we might be of the contributions of such early American geographers as Matthew Montaine Maury, John Wesley Powell, and Nathaniel Southgate Shaler. Altho biographies of some have appeared, they have rarely been written by authors with geographic training and hence frequently fail to tell us the very things that geographers wish to know. *George Perkins Marsh* is a major contribution toward filling this void in geographic education. David Lowenthal, Research Associate of the American Geographical Society, has presented us with a lucid account of this pioneer American geographer, who was perhaps the first to recognize man's role as a modifier of his own environment.

As geographers we best remember Marsh for the unique historical and geographic insights he set forth in his monumental work *Man in Nature*. This book contributed in a major fashion to the development of the American conservation movement. Lowenthal's goal in writing this biography was to more than merely point up Marsh's study of man's role in changing the face of the earth. He rightly attempted to place Marsh in the main stream of a developing philosophy of geography.

Marsh's career was a remarkable one. Lawyer, editor, Congressman, diplomat, manufacturer, and farmer, Marsh is also labeled by Lowenthal as the broadest scholar of his time. In view of his absolute mastery of 20 languages, his contributions to Scandinavian and English linguistics and to comparative philology, in addition to his original insights on the nature of man on the earth, Marsh's many-sidedness can scarcely be denied.

If it were solely for his chapter on *Man and Nature*, geographers would owe Lowenthal a debt; however, he has given us far more. This book illustrates the best in scholarship, for it is representative of exhaustive research combined with an acute awareness that there is an art of writing biography.

PHILLIP BACON

Teachers College, Columbia University

Marguerite Logan. **Geographical Bibliography for all the Major Nations of the World: Selected Books and Magazine Articles.** M. Logan, 630 Pinehurst, Kalamazoo, Mich., 1959. 396 pages. $7.50.

This paper bound book of 396 pages, printed by the offset process and marketed directly by the author, presents in well-organized form a geographical bibliography for all the major nations of the world.

Designed for the student, teacher, or traveler, the book is divided into six parts as follows: Part 1, Readings on the Geography of Africa; Part 2, Readings on the Geography of Anglo-America; Part 3, Readings on the Geography of Asia; Part 4, Readings on the Geography of Australia; Part 5, Readings on the Geography of Europe; Part 6, Readings on the Geography of Latin America and Antarctica.

Under each of the following headings relating to Africa are listed separately books and magazine articles: (1) General Readings on the Geography of Africa, (2) Readings on the Geography of Egypt and the Nile, (3) Readings on the Geography of the Mediterranean Regions, (4) Readings on the Geography of the Sahara, (5) Readings on the Geography of West Africa, (6) Readings on the Geography of the Sudan, (7) Readings on the Geography of the Red Sea Margins and Ethiopia, (8) Readings on the Geography of Equatorial Africa, (9) Readings on the Geography of East Africa, (10) Readings on the Geography of Central Africa and the South Savanna Lands, and (11) Readings on the Geography of South Africa. In the eleven sections on Africa there are 400 listings of books and 215 listings of magazine articles.

All the other continents receive comparable treatment with books and magazine articles listed separately.

Most of the listings have been written since 1950 but some background material has been included in order to further the understanding of present day conditions.

This publication will serve as an invaluable aid to any one wishing to know what material is available on the geography of the various continents or any major parts thereof.

Floyd F. Cunningham

Southern Illinois University

Morton Duryea. **Who Lives in a Field.** Coward-McCann, Inc., 210 Madison Avenue, New York, 1959. 118 pages including 34 pages of authentic nature drawings by Douglas Howland. $3.00.

To teachers of elementary school children interested in emphasizing science, *Who Lives in a Field* would be an excellent book for the introduction and development of a nature study unit. For a geography teacher this book is equally valuable for its description of the interdependence of animals upon each other, the interdependence of plant and animal life, and the balance maintained in nature as well as adaptations necessary in terms of natural resources.

Who Lives in a Field gives a detailed study of six animals including their housing, food getting, communication, protection, reproduction, and care of their young. Tho each animal is a separate study, the author cleverly interweaves the animals thruout the book by showing how each must secure food without falling prey to his enemies. The animals are the barred owl, the white-footed mouse, the short-tailed shrew, the woodchuck, the cottontail rabbit and the gray fox.

A 12 year old boy who has built a tree house in an old sycamore studies the habits of these animals and ties their relationships together. Children could easily follow David's plan for studying wild animals without injuring them. Urban children as well as rural children could find places in which to make similar studies.

The stories are filled with excitement and suspense and would please adventure loving children. Children in the primary grades would enjoy hearing the story and looking at the illustrations while intermediate grade children could read this book independently.

The paper is of excellent quality while the size and type of print makes for easy reading. Tho this is not a textbook, it is a fine reference book for any classroom library or child's individual library.

RUTH SUGARMAN
State University of New York
College for Teachers at Buffalo

A. Austin Miller and M. Parry. **Everyday Meteorology.** Philosophical Library, Inc., 15 East 40th Street, New York 16, New York, 1959. 270 pages with appendix, index, introduction, illustrations, and table of contents. $7.50.

This well-written dignified book, authored by two geographers on the staff of the University of Reading, is a scholarly work planned to serve the average person seeking some fundamental nonmathematical knowledge concerning the weather. In the words of the authors "there is some justification for presenting a 'Met. without Maths,' which is what we intend to do.

"Our presentation will be descriptive and explanatory, and our approach is through the appreciation of the Air Mass."

The implication of the book's title and of most of the Introduction warrants one to anticipate a popular presentation. Only flashes of the latter style occur here and there in Chapters 1 to 8; the remaining four chapters measure up to expectations reasonably well. The people of the British Isles, somewhat more serious than we, are likely to more readily accept the entire work as "light" reading. For the American school teacher seeking to augment his or her knowledge of meteorology, and particularly of the relation of air masses to weather, this volume should serve effectively.

There is little with which to take serious issue. We might wish that the anticyclone (p. 161) were treated with somewhat greater respect. But then, this attitude is in accord with that of meteorologists everywhere, a point of view we are inclined to believe will one day change.

We agree with the authors that the term "temperate" is unsatisfactory, but disagree that it is necessarily "fixed for good" (p. 184). If we could substitute for it, as the reviewer has done for many years, some such word as "intermediate" and employ this term frequently, the world would, in due course, divorce itself from "temperate" on grounds of incompatibility.

EUGENE VAN CLEEF
The Ohio State University

Sanson d'Abbeville. **America 1667.** Edited by L. M. Bloch, Jr. Bloch and Company, 1010 Euclid Building, Room 402, Cleveland 15, Ohio, 1959. 64 pages with index, table of contents, and maps. $3.95.

This is the first of a projected three volume translation of the description of North and South America by Sanson d'Abbeville, geographer to King Louis XIV of France. It is unfortunate that the undertaking has been split up in this way. It means that each volume will be slight, both in size and content. On the other hand, the extent of country covered is very wide. The present volume deals with settlements in what is now the United States and Canada. The other two will present descriptions in what is now Latin America.

The descriptions themselves present no material that is not easily available elsewhere in greater detail. Their chief value and the *raison d'être* for the translation is in

presenting the geography of North America as it was known to the French in the latter part of the seventeenth century. Easily the most important and most attractive features of the volume are its four maps—North America, New France, Florida and New Mexico and California (the latter shown as an island)—each in color on a double page of parchment inserted in the text. These are reproductions of d'Abbeville's original maps which occupy a prominent place in the early cartography of the New World.

The regions described in the text are the Arctic Lands, Greenland, New France, New England, New Netherlands, Virginia, Florida, the Appalachians and New Mexico and California. Each description occupies only a few pages, usually two or three, and emphasizes native customs, rivers and animal life. Practically no assessment is made of d'Abbeville's information. There are no footnotes. In a few places, the editor has inserted a note of corroboration or error in brackets in the text. These whet the appetite for more.

R. Louis Gentilcore

McMaster University
Hamilton, Ontario

Andrew Hill Clark. **Three Centuries and the Island.** University of Toronto Press, Toronto 5, Canada, 1959. xiv and 287 pages with notes, appendices, index, maps, tables, and table of contents. $10.00.

If workers in disciplines outside our own are sometimes confused regarding the nature of geography, they are even more often mystified by the term historical geography. Many a historian is strongly suspicious that historical geography represents nothing more than an unsound attempt by geographers to explain history. Their opinion stems largely from an acquaintance with books published by geographers early in the twentieth century. Unfortunately for all of us, we have had little published in historical geography beyond a handful of articles thru which we might demonstrate to our critics the unique contribution that the "modern" historical geographer can make toward understanding the past. *Three Centuries and the Island*, a study of Prince Edward Island, was not written to show historians what historical geographers can do; nevertheless, geographers will be able to point with pride to this book as a model of sound geographical scholarship.

For a number of years Professor Clark has been engaged in a study of the transfer of people from northwestern Europe to various portions of the British Empire. Students of historical geography are familiar with his initial project, a study of South Island, New Zealand. His current book deals with a section of Maritime Canada.

The study of Prince Edward Island is concerned with patterns of location of people and their economies. The method employed was to seek out available evidence that enabled him to map the distributions of people and their agricultural economy at various times in the past. Clark's astute analysis and interpretation of these maps helps the reader understand how and why these patterns changed thru time.

Three centuries of change in Prince Edward Island are lucidly depicted in the 155 maps that form the core of this book. Doubtless numerous other maps were prepared in the course of developing the manuscript. That Clark was able to discover sufficient data to produce these maps is in itself testimony to the thoroness of his investigation.

Three Centuries and the Island warrants the careful attention of all serious students of historical geography. It marks a significant contribution to geographical literature.

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